

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A semiconductor device comprising:

a semiconductor substrate;

a film stack formed on the semiconductor substrate and including a film to be processed;

a dual hard mask comprising an amorphous carbon layer and an underlying hard mask layer interposed between the amorphous carbon layer and the film to be processed, said hard mask layer not including an amorphous carbon layer, said amorphous carbon layer having at least one optical property that substantially matches the corresponding optical property of said film stack; and

a damascene structure for a metal interconnect formed in the film stack.

Claim 2 (Original): The device of claim 1, wherein said amorphous carbon layer comprises a part of a lithographic structure during the formation of said metal interconnect in said film stack.

Claim 3 (Original): The device of claim 1, wherein said amorphous carbon layer comprises a chemical mechanical polishing (CMP) stop layer for said damascene structure.

Claim 4 (Currently Amended): The device of claim 1, wherein said amorphous carbon layer is ~~comprises~~ an anti-reflective layer ~~coating~~.

Claim 5 (Canceled).

Claim 6 (Currently Amended): The device of claim 1 [[5]], wherein said at least one optical property properties comprise includes at least one of an index of refraction; and an extinction coefficient.

Claim 7 (Original): The device of claim 6, wherein said index of refraction comprises a value ranging from 1.5 to 1.9.

Claim 8 (Original): The device of claim 6, wherein said extinction coefficient comprises a value ranging from 0.1 to 1.0.

Claim 9 (Original): The device of claim 6, wherein at least one of said index of refraction and said extinction coefficient is graded along a thickness of said amorphous carbon layer.

Claim 10 (Original): The device of claim 6, wherein said index of refraction comprises a value ranging from 1.1 to 1.9.

Claim 11 (Original): The device of claim 1, wherein said amorphous carbon layer comprises at least one of chemical vapor deposition (CVD) coating, and plasma enhanced CVD coating.

Claim 12 (Original): The device of claim 1, wherein said amorphous carbon layer is configured to provide at least one of control of a critical dimension of said single damascene structure, and control of a critical dimension variation of said damascene structure.

Claim 13 (Original): The semiconductor device of claim 1, wherein said damascene structure is a single damascene structure.

Claim 14 (Original): The semiconductor device of claim 1, wherein said damascene structure is a dual damascene structure.

Claim 15 (Original): The semiconductor device of claim 1, wherein said film to be processed comprises a low-k dielectric layer.

Claim 16 (Original): The semiconductor device of claim 1, wherein said hard mask layer comprises a nitride.

Claim 17 (Original): The semiconductor device of claim 1, wherein said hard mask layer comprises at least one of silicon nitride (Si_3N_4), a refractory metal and refractory metal nitride such as tantalum nitride (TaN).

Claim 18 (Original): The semiconductor device of claim 1, wherein said hard mask layer comprises a carbide.

Claim 19 (Original): The semiconductor device of claim 1, wherein said hard mask layer comprises at least one of silicon carbide (SiC) or silicon oxycarbide (SiCO).

Claims 20-36 (Canceled).

Claim 37 (New): A semiconductor device comprising:

a semiconductor substrate;

a film stack formed on the semiconductor substrate and including a film to be processed;

a dual hard mask comprising an amorphous carbon layer and an underlying hard mask layer interposed between the amorphous carbon layer and the film to be processed, said hard mask layer not including an amorphous carbon layer, said amorphous carbon layer is an anti-reflective layer; and

a damascene structure for a metal interconnect formed in the film stack.

Claim 38 (New): The device of claim 37, wherein said amorphous carbon layer has at least one optical property that substantially matches the corresponding optical property of said film stack.

Claim 39 (New): The device of claim 38, wherein said at least one optical property includes at least one of an index of refraction and an extinction coefficient.

Claim 40 (New): The device of claim 39, wherein said index of refraction comprises a value ranging from 1.5 to 1.9.

Claim 41 (New): The device of claim 39, wherein said extinction coefficient comprises a value ranging from 0.1 to 1.0.

Application No. 10/766,872
Reply to Office Action of August 5, 2005

Claim 42 (New): The device of claim 39, wherein at least one of said index of refraction and said extinction coefficient is graded along a thickness of said amorphous carbon layer.

Claim 43 (New): The device of claim 39, wherein said index of refraction comprises a value ranging from 1.1 to 1.9.